

WHAT IS CLAIMED IS:

1. An apparatus for sorting a plurality of substantially flat items for delivery to a plurality of recipients, the apparatus comprising:

5 means for receiving items to be sorted, a destination recipient address being associated with each item;

a plurality of sorting bins into which items to be sorted are to be deposited;

10 guide means, coupled to the means for receiving items and the sorting bins, for directing received items to the plurality of sorting bins;

means for inputting data relating to the plurality of items, the data including at least each destination recipient address;

15 means for inputting data defining a pre-determined sequence of candidate recipient addresses to which the items will ultimately be delivered;

20 a control unit for receiving the data relating to the plurality of the items and the data defining the pre-determined sequence of recipient addresses, for allocating one or more sorting bins to recipient addresses in the sequence in dependence on the data relating to the items, the number of sorting bins that are allocated to a recipient address being sufficient to accommodate all  
25 items that are associated with that destination recipient address, and for controlling the guide means to direct the items to the one or more sorting bins so allocated,

30 and wherein the control unit only operates the guide means to direct the received items to the respective sorting bins once it has received the data for the entire plurality of items to be sorted and can allocate sufficient sorting bins appropriately.

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2. An apparatus according to claim 1 wherein the control unit allocates the sorting bins such that only those candidate recipient addresses to which items are to be delivered are allocated one or more sorting bins.

5 3. An apparatus according to claim 1 wherein the control unit allocates the sorting bins such that candidate recipient addresses that are adjacent in the sequence are allocated adjacent sorting bins.

10 4. An apparatus according to claim 1 in which the data relating to the plurality of items includes data describing the dimensions of each item, and wherein the control unit uses this data to allocate one or more sorting bins to a recipient address such that all items of  
15 mail to be delivered to that recipient address can be deposited in the one or more sorting bins so allocated.

20 5. An apparatus according to claim 1 wherein the means for inputting data relating to the items has a terminal at a site remote from the means for receiving the items to be sorted, the guide means and the sorting bins;

the terminal being connected by a network to the control means, such that if the items to be sorted are initially received at the remote site, the data relating  
25 to the items can be collected and transmitted to the control unit before the items themselves are delivered to the means for receiving items for sorting into the sorting bins.

30 6. An apparatus according to claim 1 in which the items to be sorted are items of mail, and in which the data defining the sequence in which the items to be sorted comprises the order in which a mail deliverer completes his route.

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7. An apparatus for sorting according to claim 1 in which each sorting bin further comprises indication means controlled by the control unit,

5 wherein entering data pertaining to an item to be sorted into the means for inputting data causes the control unit to activate the indication means for the allocated sorting bin allowing an operator to manually place the item into the sorting bin.

10 8. A method of sorting a plurality of substantially flat items for delivery to a plurality of recipients, the method comprising:

providing a plurality of sorting bins into which items to be sorted are to be deposited;

15 receiving items to be sorted, a destination recipient address being associated with each item;

receiving data relating to the plurality of items, the data including at least each destination recipient address;

20 receiving data defining a pre-determined sequence of candidate recipient addresses to which the items will ultimately be delivered;

25 allocating, once all of the data relating to the plurality of items to be sorted has been received, one or more sorting bins to recipient addresses in the sequence in dependence on the data relating to the plurality of the items, the number of sorting bins that are allocated to a recipient address being sufficient to accommodate all items that are associated with that destination recipient address;

30 directing, once the sorting bins have been allocated to the recipient addresses, the items to the one or more sorting bins allocated to the recipient address corresponding to the destination recipient address of the item.

9. A method according to claim 8 wherein only those candidate recipient addresses to which items are to be delivered are allocated one or more sorting bins.

5 10. A method according to claim 8 sorting bins are allocated such that candidate recipient addresses that are adjacent in the sequence are allocated adjacent sorting bins.

10 11. A method according to claim 8 comprising:  
receiving the items to be sorted at a site remote to the sorting bins;

collecting data relating to the items at the remote site, the data including at least recipient address information; and

15 transmitting the data from the remote site to the site at which the sorting bins are located, before the items to be sorted are delivered to that site so that the data can be used to allocate the sorting bins in advance.

20 12. A method according to claim 8 in which the data relating to the plurality of items includes data describing the dimensions of each item, and wherein one or more sorting bins are allocated to a recipient address such that all items of mail to be delivered to that recipient address can be deposited in the one or more  
25 sorting bins so allocated.

30 13. A method according to claim 8 in which the items to be sorted are items of mail, and in which the data defining the sequence in which the items to be sorted comprises the order in which a mail deliverer completes his route.

14. An apparatus for sorting items of mail comprising;  
first input means for receiving items of mail;

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a plurality of sorting bins into which items to be sorted are to be deposited;

first guide means for carrying items of mail to the plurality of sorting bins;

5 second guide means for carrying items of mail from said first input means to said first guide means;

a second input conveyor for receiving items of mail that are larger in size than those received by the first input means, said second input conveyor being coupled  
10 directly to the first guide means such that the mail that is larger in size follows a shorter path to the sorting bins than the mail input received by the first input means.

15 15. The apparatus of claim 14 wherein the sorting bins are arranged above the first and second input means and said second guide means is a substantially vertical conveyor belt.

16. The apparatus of claim 14 wherein the second input means is a conveyor belt capable of receiving items of  
20 mail that are at least C4 or equivalent in size.

17. The apparatus of claim 14 wherein the second input means is a singulator capable of singulating items of mail that are at least C4 or equivalent in size.

18. An apparatus for sorting items comprising:  
25 a plurality of collection bins, each having an opening which may receive an item of mail, arranged in one or more rows;

a diverter blade connected to each collection bin, and having a closed position in which it covers the  
30 opening to the collection bin to prevent an item of mail from entering;

means for supporting items of mail flowing across the top of the diverter blades of each collection bin in a row; and

5 a control unit for controlling a diverter blade to direct an item of mail from the items of mailing flowing across the top of the diverter blades into a pre-designated collection bin;

10 wherein each collection bin is provided with a gently curved guide plate which slopes from being substantially horizontal at the opening of the collection bin to being near vertical at the base of the collection bin.

15 19. The apparatus of claim 18 in which a region of the curved guide plate which comes into contact with a sorted item as the item enters the collection bin is provided with means to slow the item's descent into the collection bin.

20 20. The apparatus of claim 19 in which the means to slow an item's descent is a braking material disposed on the surface of the curved guide plate.

21. The apparatus of claim 18 in which the collection bins are formed by the space between two adjacent curved guide plates.

25 22. The apparatus of claim 21 further comprising an output conveyor for carrying sorted items away from the collection bins, the output conveyor having an upper surface;

30 wherein the output conveyor is positioned below the curved guide plates of the collection bins such that an item of mail directed into the collection bin comes to rest between the curved guide plates and against the upper surface of the output conveyor.

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23. The apparatus of claim 22 comprising means for raising the curved guide plates of all of the collection bins such that the items of mail in the collection bins are output onto the upper surface of the output conveyor in the order into which they had been sorted.

24. Apparatus for deflecting an item of mail into a collection bin comprising:

- a plurality of collection bins, each having an opening which may receive an item of mail, arranged in one or more rows;
- a diverter blade connected to each collection bin, and having a closed position in which it covers the opening to the collection bin to prevent an item of mail from entering;
- means for supporting items of mail flowing across the top of the diverter blades of each collection bin in a row; and
- a control unit for controlling a diverter blade to direct an item of mail from the flow into a pre-designated collection bin;
- wherein the diverter blade comprises a substantially flat plate having a cut out section into which a portion of an adjacent diverter plate may be received, such that the length of the diverter plates may be longer than the separation between collecting bins.

25. The apparatus of claim 24 wherein the diverter blade is connected to the collection bin at a pivot, the cut out section being disposed at the edge of the flat plate of the diverter blade closest to the pivot and receiving the leading edge of the converter blade of the collection bin behind it in the row.

26. The apparatus of claim 25 wherein the leading edge of the diverter blade is provided with a protruding section of narrower width than the flat plate, the protruding

section angling down near its tip to form a flange which interlocks with the cut out section of the diverter blade forward of it in the row of collection bins when the diverter blade is in the closed position.

5 27. The apparatus of claim 24 wherein the diverter blades corresponding to each collection bin are mounted on a rotatable axle such that rotation of the axle causes the diverter blade to rotate, the axle being controlled by the control means to rotate and cause the diverter to direct  
10 an item of mail from the flow of items of mail into a collection bin; and

wherein the means for supporting items of mail flowing across the top of the diverter blades is a plurality of rollers mounted on the axles such that they  
15 may rotate freely and independently of the axle.

28. An apparatus for transporting mail comprising:  
a number of surface rollers forming a surface across which the mail is transported;

a conveyor belt positioned above the surface rollers such that mail held between the conveyor and the rollers is transported along the surface formed by the rollers;  
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wherein the surface rollers are arranged to form a convex surface whereby tension is created in the conveyor belt to ensure that mail is kept substantially in contact with the convex surface.  
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29. The apparatus of claim 28 further comprising:

a control unit;

a plurality of collecting bins disposed under the surface formed by the rollers; and

30 a diverter blade connected to each of the collecting bins underneath and disposed in between the rollers on the surface, the diverter blade having a first position substantially planar with the surface and a second position above the surface where it intercepts the mail



being transported along the surface to direct it into the collecting bin to which the diverted blade is attached; wherein the control unit may control the diverter blades to direct mail to pre-designated collecting bins.

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30. An apparatus for sorting items comprising:

first and second means for inputting items to be sorted;

10 separate first and second arrays of sorting bins for receiving the items in the sort;

guide means for directing the items to be sorted to a predesignated sort bin in one of the first or second arrays of sort bins; and

15 control means for operating the guide means;

wherein the control means instructs the guide means to direct items such that items received at either of the first or second input means may be directed to a sort bin in either of the first or second array of sorting bins.

20 31. An apparatus for sorting substantially flat items, comprising:

input means for receiving items to be sorted;

a plurality of moveable divider plates, the space between two moveable divider plates forming a sorting bin for receiving the items following sorting;

25 conveyor means to direct the items from the input means to a pre-designated sort bin;

control means to operate the conveyor means such that the items are directed to a pre-designated sorting bin and are sorted into a pre-designated order across the sorting bins; and

30 an output conveyor disposed underneath the plurality of sorting bins to receive sorted items; wherein

when sorting has been completed across the sorting bins, the moveable divider plates are raised together causing the items within the sorting bin to fall onto the

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output conveyor belt such that the order into which they had been sorted is retained.

32. The apparatus of claim 31 in which the moveable  
5 divider plates are fixed to an upper pivot near such that when they are raised they rotate around the pivot.

33. The apparatus of claim 31 comprising guide means  
proximate the entrance to a sorting bin which angles the  
items within the sorting bin such that the substantially  
10 flat surface of the item is non-horizontal with respect to the output conveyor belt.

34. The apparatus of claim 31 wherein the moveable divider  
plates are curved such that an item falling down the  
curved surface of a divider plate is angled to adopt an  
15 orientation in which the substantially flat surface of the item is non-horizontal to the output conveyor belt.

35. The apparatus of claim 31 wherein the moveable divider  
plates are positioned such that the bottom item within the  
sorting bin comes to rest on the upper surface of the  
20 output conveyor belt.

36. A method of sorting substantially flat items, -  
comprising:

providing a sorting apparatus comprising input means  
for receiving items to be sorted; a plurality of moveable  
25 divider plates, the space between two moveable divider plates forming a sorting bin for receiving the items following sorting; conveyor means to direct the items from the input means to a pre-designated sort bin; control means to operate the conveyor means such that the items  
30 are directed to a pre-designated sorting bin and are sorted into a pre-designated order across the sorting bins; and an output conveyor disposed underneath the plurality of sorting bins to receive sorted items;

inputting items to be sorted into the input means;  
operating the apparatus to sort the items into pre-  
designated sorting bins; and

5 raising the moveable divider plates together, when  
sorting has been completed, causing the items within the  
sorting bin to fall out onto the output conveyor belt such  
that the order into which they had been sorted is  
retained.

10 37. The method of claim 36 in which the moveable divider  
plates are fixed to a pivot near to their top such that  
when they are raised they rotate around the pivot.

15 38. The method of claim 36 wherein the sorting apparatus  
comprises guide means proximate the entrance to a sorting  
bin which angles the items within the sorting bin such  
that the substantially flat surface of the item is non-  
horizontal with respect to the output conveyor belt.

20 39. The method of claim 36 wherein the moveable divider  
plates are curved such that an item falling down the  
curved surface of a divider plate is angled to adopt an  
orientation in which the substantially flat surface of the  
item is non-horizontal to the output conveyor belt.

25 40. The method of claim 36 wherein the moveable divider  
plates are positioned such that the bottom item within the  
sorting bin comes to rest on the upper surface of the  
output conveyor belt.